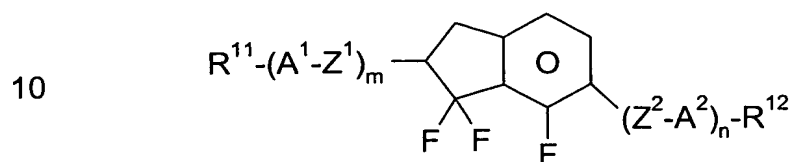


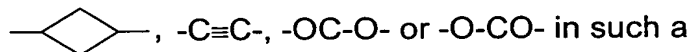
# Patent Claims

1. Liquid-crystalline medium based on a mixture of polar compounds of negative dielectric anisotropy, characterised in that it comprises at least one compound of the formula I



in which

- 15
- $R^{11}$  and  $R^{12}$  are each, independently of one another, H, an alkyl or alkenyl radical having up to 15 C atoms which is unsubstituted, monosubstituted by CN or  $CF_3$  or at least monosubstituted by halogen, where, in addition, one or more  $CH_2$  groups in these radicals may be replaced by -O-, -S-,
- 20



way that O atoms are not linked directly to one another,

- 25
- $A^1$  and  $A^2$  are each, independently of one another,

- 30
- a) a 1,4-cyclohexenylene or 1,4-cyclohexylene radical, in which one or two non-adjacent  $CH_2$  groups may be replaced by -O- or -S-,
- b) a 1,4-phenylene radical, in which one or two CH groups may be replaced by N,
- 35
- c) a radical from the group consisting of piperidine-1,4-diyl, 1,4-bicyclo[2.2.2]octylene, naphthalene-2,6-diyl, decahydronaphthalene-2,6-diyl, 1,2,3,4-

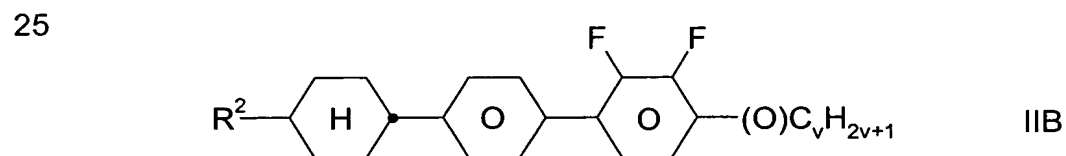
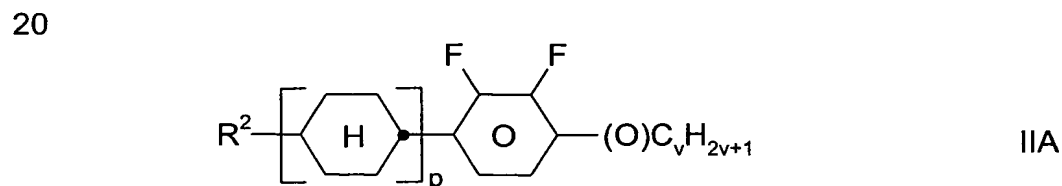
tetrahydronaphthalene-2,6-diyl, phenanthrene-2,7-diyl and fluorene-2,7-diyl,

5 where the radicals a), b) and c) may be monosubstituted or polysubstituted by halogen atoms,

10  $Z^1$  and  $Z^2$  are each, independently of one another, -CO-O-, -O-CO-, -CF<sub>2</sub>O-, -OCF<sub>2</sub>-, -CH<sub>2</sub>O-, -OCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>-, -(CH<sub>2</sub>)<sub>4</sub>-, -C<sub>2</sub>F<sub>4</sub>-, -CH<sub>2</sub>CF<sub>2</sub>-, -CF<sub>2</sub>CH<sub>2</sub>-, -CF=CF-, -CH=CF-, -CF=CH-, -CH=CH-, -C≡C- or a single bond, and

15 m and n are each, independently of one another, 0, 1 or 2, where  $m + n \geq 1$ .

2. Liquid-crystalline medium according to Claim 1, characterised in that it additionally comprises one or more compounds of the formulae IIA and/or IIB



30 in which

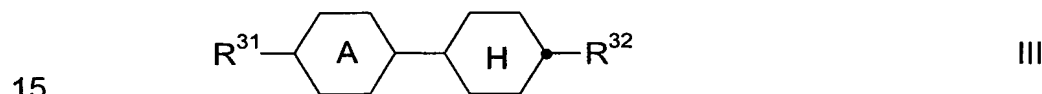
35  $R^2$  is an alkyl or alkenyl radical having up to 15 C atoms which is unsubstituted, monosubstituted by CN or CF<sub>3</sub> or at least monosubstituted by halogen, where, in addition, one or more CH<sub>2</sub> groups in these radicals may each be replaced, independently of one another, by -O-, -S-, , -C≡C-, -CO-,

-CO-O-, -O-CO- or -O-CO-O- in such a way that O atoms are not linked directly to one another,

5 p is 1 or 2, and

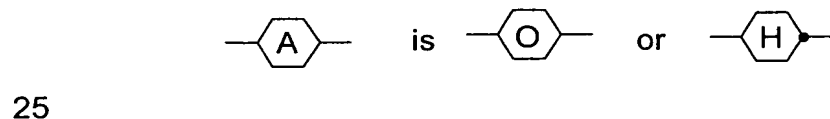
v is from 1 to 6.

10 3. Liquid-crystalline medium according to Claim 1 or 2, characterised in that it additionally comprises one or more compounds of the formula III



in which

20 R<sup>31</sup> and R<sup>32</sup> are each, independently of one another, a straight-chain alkyl, alkenyl, alkylalkoxy or alkoxy radical having up to 12 C atoms, and

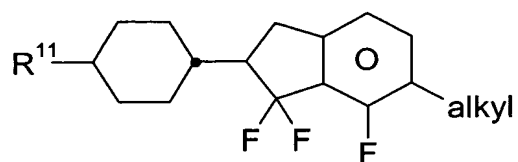


4. Liquid-crystalline medium according to one of Claims 1 to 3, characterised in that it comprises one, two, three, four or more compounds of the formula I.

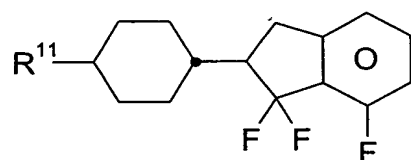
30 5. Liquid-crystalline medium according to one of Claims 1 to 4, characterised in that the proportion of compounds of the formula I in the mixture as a whole is at least 5% by weight.

35 6. Liquid-crystalline medium according to one of Claims 1 to 5, characterised in that the proportion of compounds of the formulae IIA and/or IIB in the mixture as a whole is at least 20% by weight.

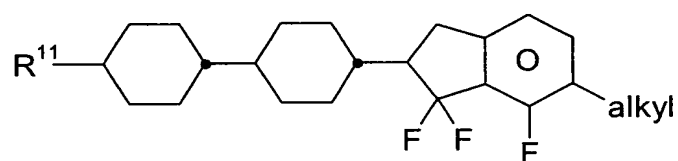
7. Liquid-crystalline medium according to one of Claims 1 to 6,  
characterised in that the proportion of compounds of the formula III in  
the mixture as a whole is at least 5% by weight.
8. Liquid-crystalline medium according to one of Claims 1 to 7,  
characterised in that it comprises at least one compound selected  
from the formulae I1 to I36



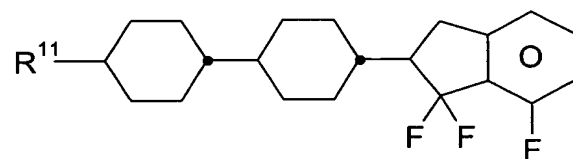
I1



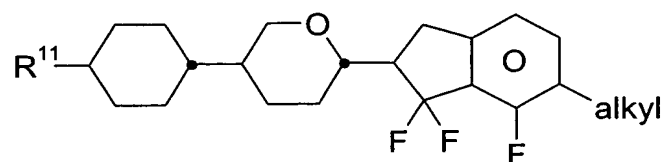
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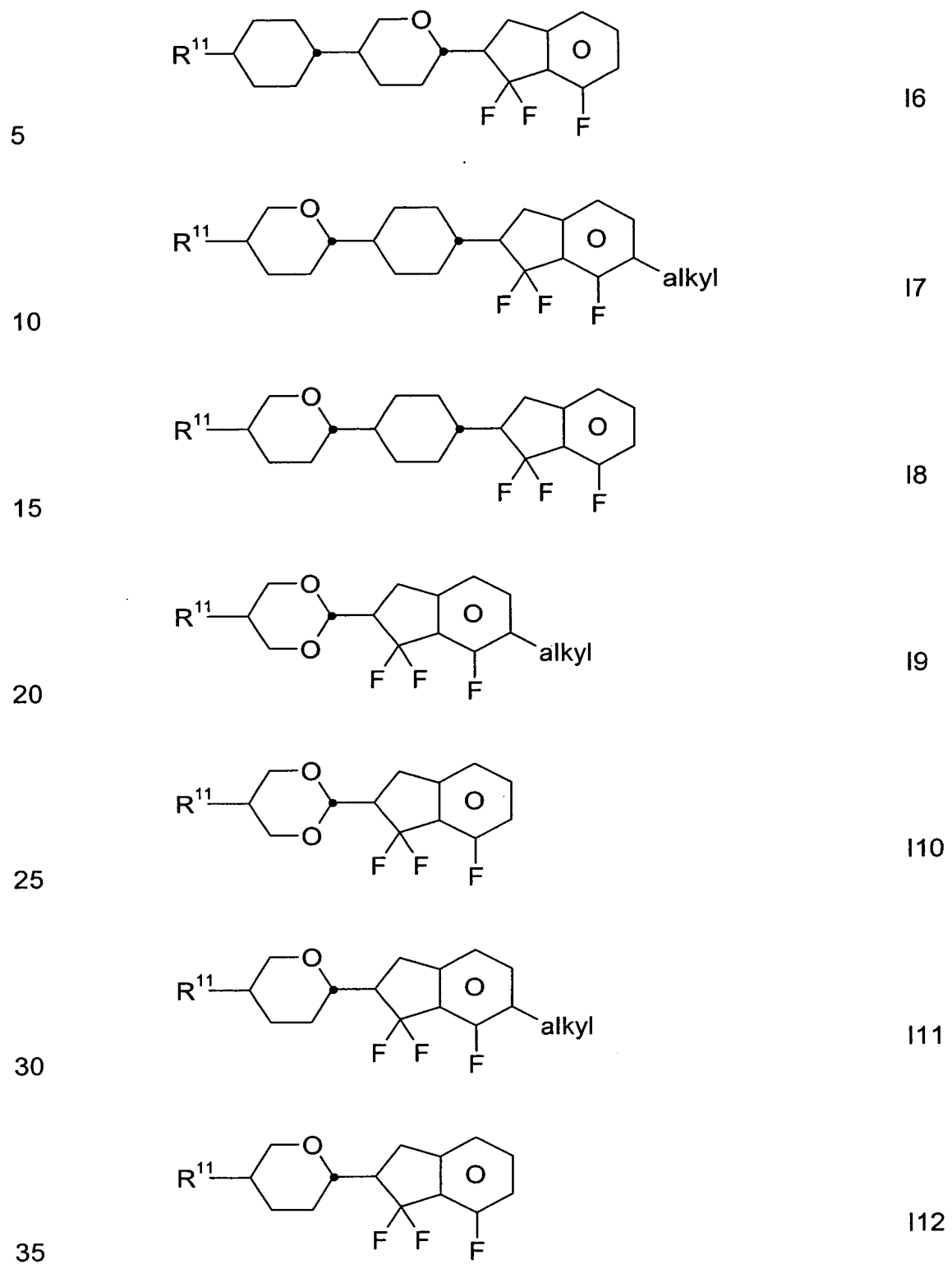
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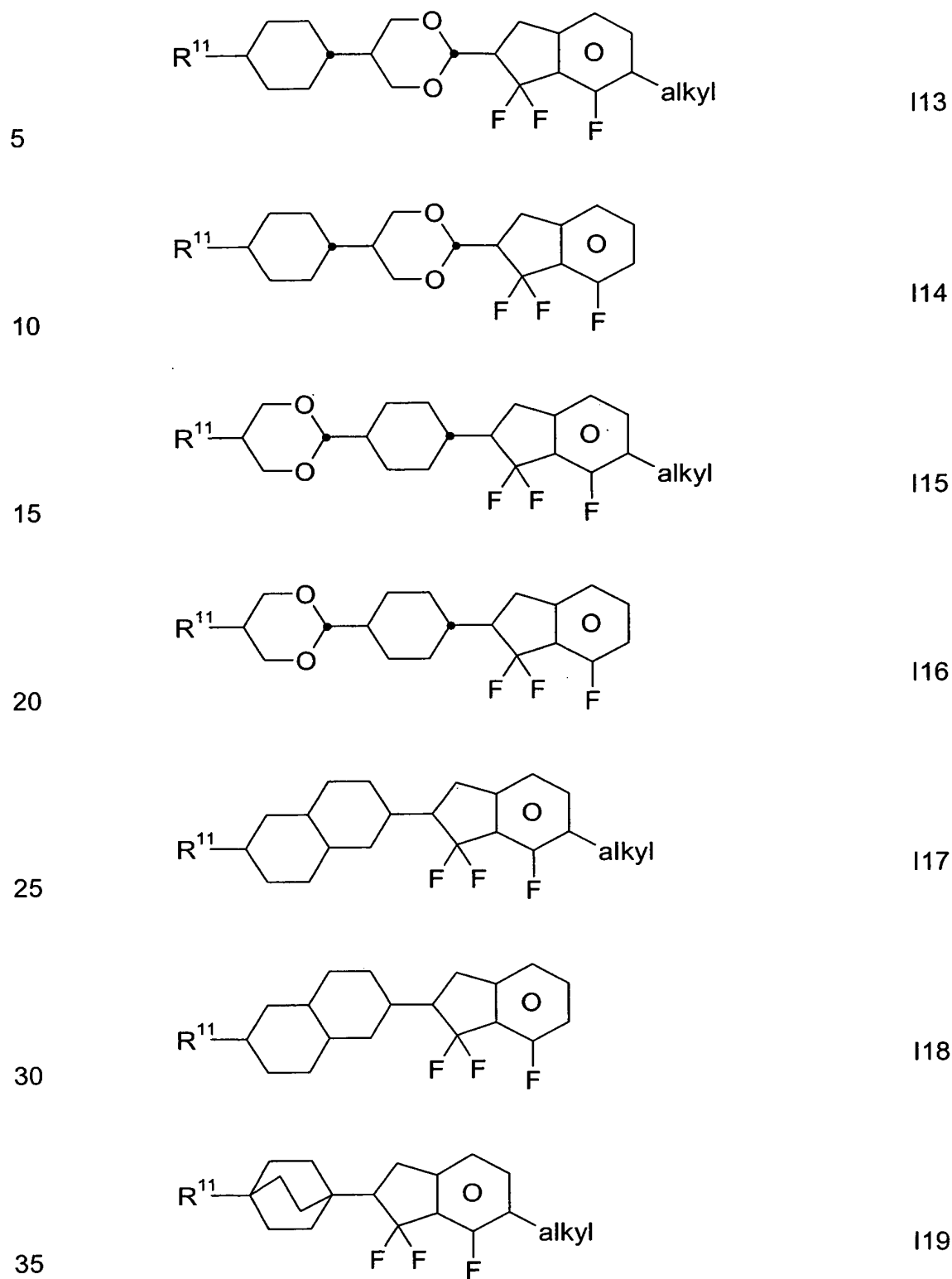


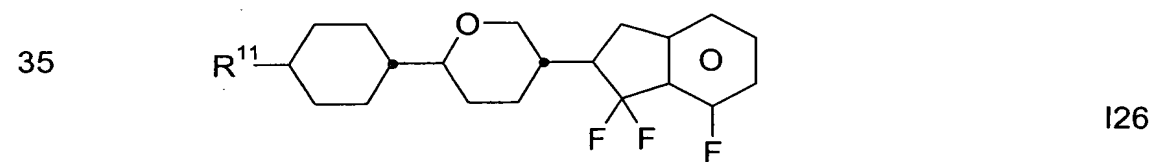
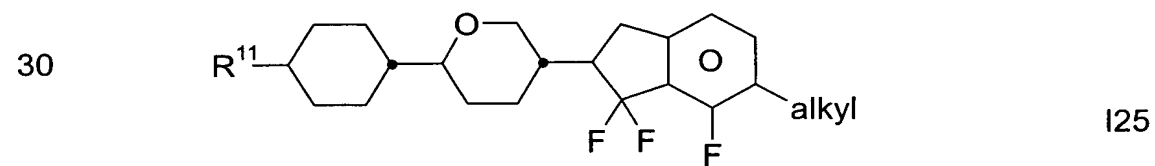
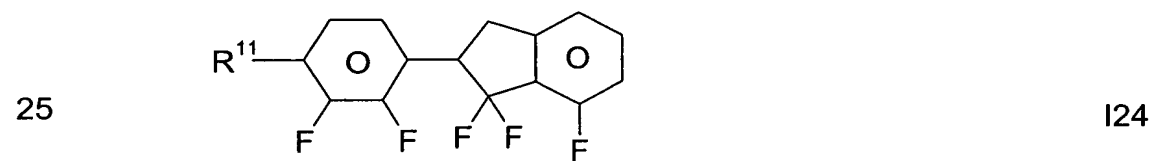
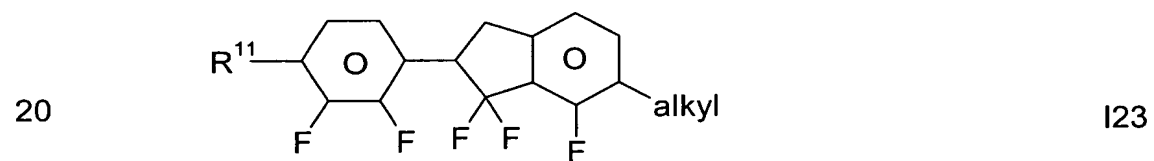
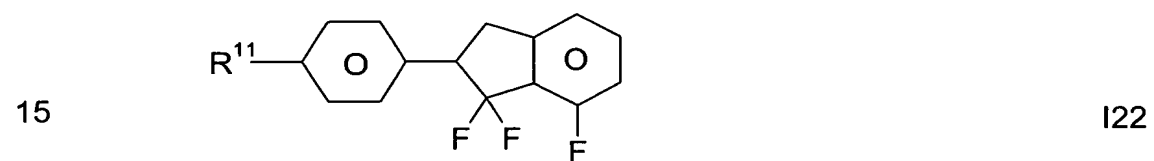
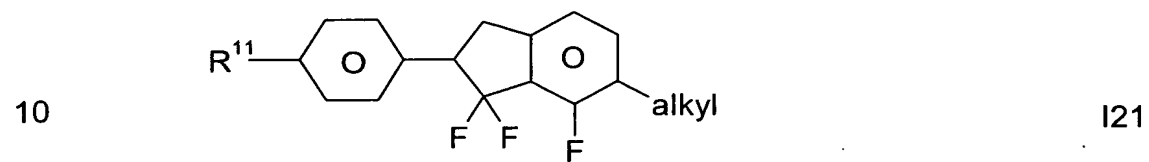
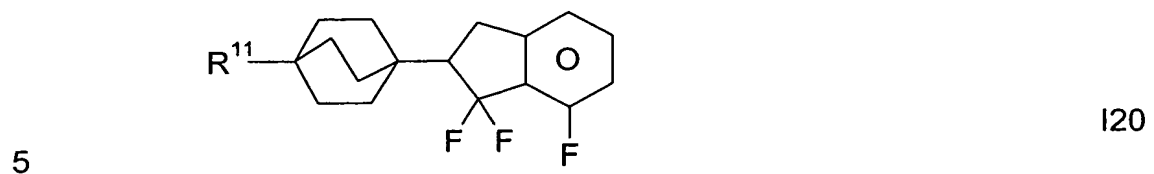
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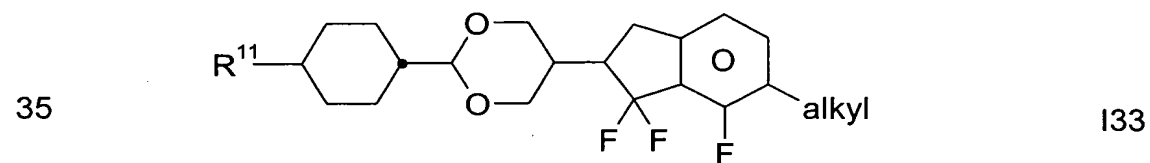
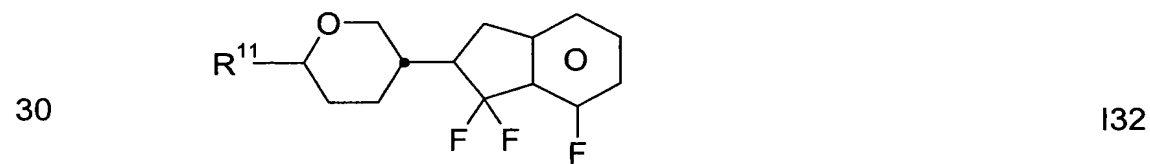
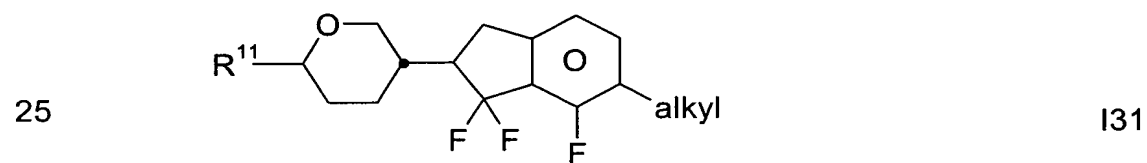
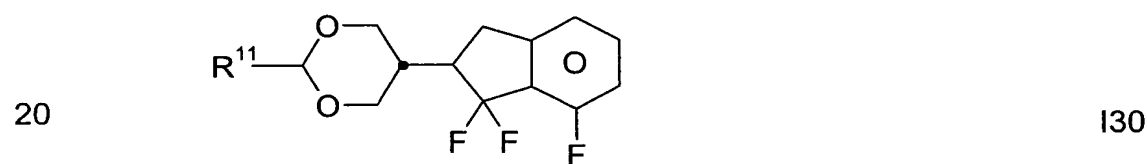
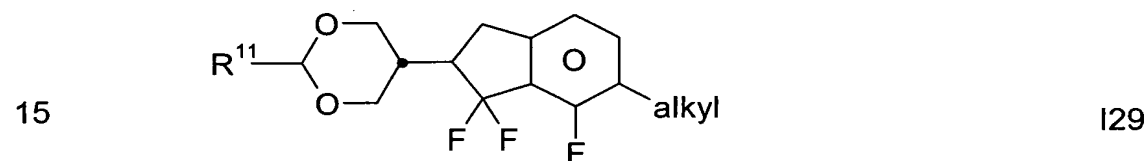
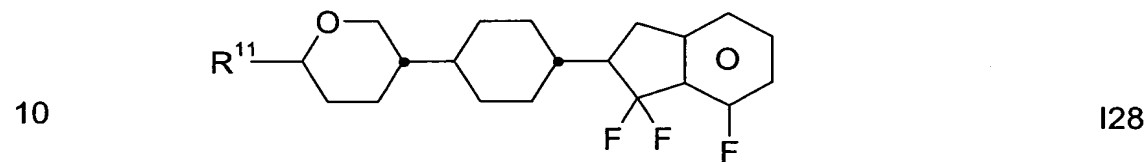
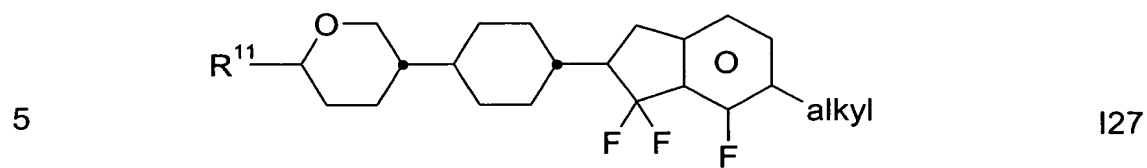


I5

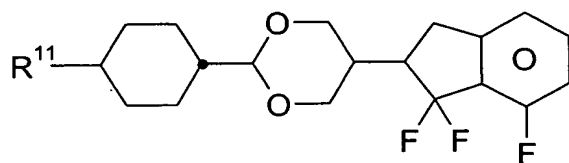




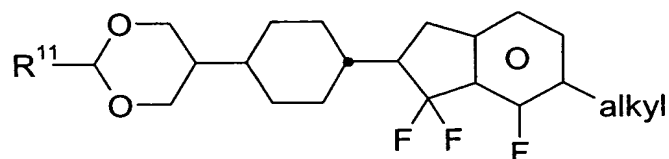




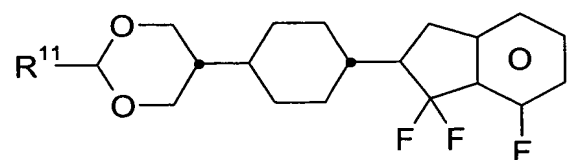




I34



I35



I36

in which

$R^{11}$  is as defined in Claim 1, and alkyl is a straight-chain alkyl radical having 1-6 C atoms.

9. Liquid-crystalline medium according to one of Claims 1 to 8, characterised in that it essentially consists of

5-30 % by weight of one or more compounds of the formula I

and

20-70 % by weight of one or more compounds of the formulae IIA and/or IIB.

10. Electro-optical display with active-matrix addressing based on the ECB, PALC or IPS effect, characterised in that it contains, as dielectric, a liquid-crystalline medium according to one of Claims 1 to 9.